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1   PRICING METHOD AND PROGRAM PRODUCT FOR USAGE BASED

2   SERVICE

3   Field of the Invention

4   The present invention is directed to methods and systems for pricing

5   usage based services. More particularly, the present invention is directed to

6   methods and systems for pricing of a session of computer network service

7   usage and the like.

8   Background of the Invention

9   The market for usage-based services has expanded greatly in the recent

10   past. In particular, the "information age" has introduced a wide variety of on-

11   line network services. Professionals in the legal, financial, and medical

professions, by way of example, are regular consumers of on-line information network services. Business to business service models provide for on-line access to computing centers, call centers, and the like. Through so-called "utility computing", for example, companies can pay for on-line access to advanced computer resources that may be required from time to time.

Additionally, the ubiquitous presence of the internet in the present day in the form of the World Wide Web has brought on-line network services to retail consumers. The near term future promises to expand the presence of such services as widespread and relatively low cost broad-band access promises a wider variety of information available on-line, such as on demand movies, gaming, music, and the like.

These services are priced in a variety of manners. Some services are available on a usage basis, with users paying for use on a per time basis, such as per minute. Other pricing models include flat rate subscription models, such as a per-session, per month, or a per-year pricing model. Still other pricing models are so-called hybrid models that combine elements of flat-rate and usage based models. In addition to time unit basis, services may be priced on other usages as well, such as a per printed page of output, per byte of downloaded information, per song downloaded, and the like.

While many pricing models for usage based services are known, there are many as yet unresolved problems in the art. For example, flat rate models and per usage models may be too simple to optimize revenue for many providers. There is increasing pressure to price services such that users "pay for what they use", which is often not possible using current pricing models. By way of example, flat rate models have proven to be susceptible to extreme over use by a small percentage of subscribers, thereby increasing costs for providers. Per usage pricing models are strained by users with high-speed access that can download much more information in much less time than previously possible. Hybrid plans, on the other hand, while providing some degree of flexibility, are often so complicated to implement as to be impractical.

1   There is therefore an as yet unresolved need in the art for effective
2   service pricing models.

3   Summary of the Invention
4   The present invention is directed to a method for pricing a usage based
5   service, and generally comprises the steps of dividing a potential usage period
6   into a plurality of tiers, determining the cost for each of the tiers entered during
7   a usage session, and totaling these costs for a total session cost. There are two
8   costs associated with each tier: an incremental cost charged when the tier is
9   entered, and a tier usage based cost that is calculated by multiplying the amount
10   of usage that occurs in the tier by a tier usage rate. The tiers are preferably
11   characterized with a beginning threshold usage that defines where the tier
12   begins, and a tier duration usage that defines the length of the tier. Preferably,
13   the first tier has a beginning threshold of zero units of usage, and the last tier
14   extends to infinite units of usage. With these preferred bounds, the method of
15   the invention can be used for pricing any amount of usage.
16   The method of the invention provides for important advantages in terms
17   of flexibility and ease of application. By adjusting incremental charges and
18   usage rates, the method of the invention may in practice function as anything
19   from a pure fixed cost pricing model, a pure usage based pricing model, a
20   hybrid pricing model, and almost any variant in between. Preferably, the
21   invention may be practiced with negative tier usage rates and tier incremental
22   charges as desired to provide a pricing model capable of encouraging users to
23   cross over into more profitable tiers, thereby providing a valuable tool for
24   maximizing revenue. Additionally, the method of the invention achieves this
25   wide range of flexibility in a relatively simple and easily applied format that is
26   advantageous for cost and ease of use considerations.
27   Those knowledgeable in the art will appreciate that the method of the
28   present invention lends itself well to practice in the form of a computer
29   program product. Accordingly, an additional embodiment of the present

1   invention comprises a computer program product for causing a computer to
2   determine a price for a session of a usage based service.

3   The above brief description sets forth in a broad fashion several of the
4   more important features of the present disclosure so that the detailed
5   description that follows may be better understood, and so that the present
6   contributions to the art may be better appreciated. There are, of course,
7   additional features of the disclosure that will be described hereinafter. In this
8   respect, before explaining an embodiment of the disclosure in detail, it is to be
9   understood that the disclosure is not limited in its application to the details as
10 set forth in the following description or illustrated in the drawings. The present
11 invention is capable of other embodiments, as will be appreciated by those
12 skilled in the art. Also, it is to be understood that the phraseology and
13 terminology employed herein are for description and not limitation.

14   Brief Description of the Figures
15   FIGURE 1 is a graph helpful in illustration of an embodiment of the
16 invention.
17   FIGS. 2(a)-(c) are a flow chart illustrating an embodiment of the
18 invention.

19   Detailed Description
20   The method and program product of the invention generally comprise
21 calculating a total usage session cost by totaling the charges for each tier
22 entered during the session. The charges associated with each tier comprise an
23 incremental cost charged for entering the tier, and a tier usage cost calculated
24 by multiplying the amount of usage in a tier by the tier's usage rate.

25   Turning now to the drawings, FIG.1 is a chart useful in illustrating an
26 embodiment of a method and computer program product of the invention. In
27 general, this embodiment of the invention comprises dividing a potential on-
28 line usage service session into n tiers as shown. A total of n tiers have been
29 illustrated to point out that the method and program product of the invention

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1   are not limited to any particular number of tiers, so long as a plurality of tiers
2   are comprised. It is anticipated that a preferred number of up to four tiers will
3   be useful for practice of an embodiment of the invention useful for pricing of
4   consumer internet service providers.

5   As illustrated by the chart of FIG. 1, the tiers proceed along the X-axis 4
6   that has usage units of time. The Y-axis 6 has units of cost, which are
7   preferably dollar amounts as illustrated in FIG. 1. It will be appreciated that
8   many additional units of usage and cost could be comprised within the scope of
9   the present invention. By way of example, it is anticipated that online
10   computer services may increasingly charge for usage in units of processor
11   consumption or information downloaded, with possible usage units thereby
12   comprising bits, bytes, pages, documents, processor use time, songs, movies, or
13   the like. It will additionally be appreciated that cost may be measured in a
14   wide variety of units other than money.

15   Each tier is characterized by a beginning threshold value illustrated in
16   FIG. 1 by dashed vertical lines 8(a) – 8(n), and a tier duration illustrated by
17   dashed horizontal line segments 9(a) – 9(n), which comprises the distance
18   along the X-axis the tier extends. Each tier also has an endpoint that is equal to
19   the beginning threshold plus the duration. By way of example, tier 3 has a
20   beginning threshold value 8(b) of 10 min., a duration 9(c) of 10 min., and an
21   endpoint at 20 min. Preferably the first tier has a beginning threshold value
22   8(a) (coincident with the Y-axis) of 0 min, and a final tier(n) extends to infinite
23   usage. With these preferred bounds, this embodiment of the pricing method
24   and computer program product of the invention can be used to fit any potential
25   on-line session.

26   It is noted that a tier duration may extend a tier to the threshold of the
27   next tier. That is, one tier may end coincident with the beginning of a
28   subsequent tier, or a tier duration may extend a tier to a usage amount just less
29   than the beginning threshold of the subsequent tier. It will be understood that
30   as used the tiers being "consecutive" with one another is intended to refer to a
31   condition whereby any usage value along the axis falls within one of the

1   plurality of tiers.   Further, as used herein, the term "coincident", the term "an

2   endpoint coincident with a beginning threshold", and the like will be

3   understood to encompass a condition of an endpoint with a beginning threshold

4   just greater than the end, as well as an endpoint that is equal to the next

5   beginning threshold.

6   This embodiment of the invention also comprises assigning each tier 2

7   an incremental charge 12(a) – 12(d) illustrated in FIG. 1 by a dashed vertical

8   line. The incremental charge 12 can be thought of as a fixed fee associated

9   with entry of a tier. Preferably, the incremental charge associated with the first

10   tier is zero. The incremental charges 12 assigned to tiers other than the first tier

11   are preferably not limited to amounts greater than zero, and thus may comprise

12   any number, including zero or a negative number, as illustrated by FIG. 1 (see,

13   e.g., the negative incremental charge 12(c) or the zero incremental charge of

14   Tier(n)). Additional steps of the method and program product of the invention

15   comprise assigning a tier usage rate to each tier. The tier usage rate is then

16   multiplied by the usage amount that occurs within the tier to result in a usage

17   cost for the tier. The preferred usage rate can comprise a positive, negative, or

18   zero rate.

19   Table 1 summarizes the beginning threshold values 8, the incremental

20   charges 12, the tier durations 9, and the usage rates for each tier as illustrated

21   by the chart of FIG. 1:

	Beginning Threshold Value:	Tier Duration:	Incremental Charge:	Usage Rate:
TIER 1	0 min.	10 min.	$0	$1/min.
TIER 2	10 min.	10 min.	$10	$0/min.
TIER 3	20 min.	15 min.	- $5	$0.33/min.
TIER 4	35 min.	5 min.	$10	- $1/min.
TIER 5	40 min.	10 min.	$0	$1/min.
....	....	....	....	....
TIER (n)	(x) min.	10 min.	$0	$0/min.

TABLE 1

Once the total usage amount for a given session is determined, a cost for the session can be calculated by summing the incremental charges and the usage charges for each tier entered during the session.

With reference made to FIG. 1 and Table 1 simultaneously, this embodiment of the invention can be explained with reference to the hypothetical on-line session of Table 1 that lasts (x + 5 min.). The session begins with entry to Tier 1, which has an incremental charge of $0. As the session proceeds through Tier 1, the Tier 1 usage rate charge of $1/min results in the total session cost increasing gradually as illustrated by line 14 to total $10 as Tier 1 ends after 10 min. As the session enters Tier 2 at the Tier 2 beginning threshold time 8(b) of 10 min., the incremental charge of $10 brings the total session cost to $20. As a result of the Tier 2 usage rate of $0/min., the total session cost remains at $20 as the session proceeds through Tier 2 as illustrated by the line segment 16.

The total session cost actually decreases as the session enters Tier 3 due to the Tier's incremental charge of -$5. It will be appreciated that zero or negative incremental charges may be advantageous to encourage users to enter into tiers that provide for a higher profit session. As the session proceeds through Tier 3, the session cost gradually increases as a function of the Tier's usage rate of $0.33/min. as illustrated by line segment 18. Tier 4 has a beginning threshold value 8(d) of 35 min. and an incremental cost of $10. The line segment 20 shows the total session cost decreases as it proceeds through Tier 4 due to the -$1/min. usage rate. Like negative incremental charges, it will

1   be appreciated that zero or negative usage rates may be advantageous to
2   encourage users to continue on with a session until their session has crossed
3   over into a higher profit tier.

4   As the session crosses the 40 min. beginning threshold value 8(e) of Tier
5   5 an incremental charge of zero is incurred. The $1/min. usage rate of Tier 5
6   gradually increases the session cost as shown by line segment 22. The
7   hypothetical session of FIG. 1 continues through an unidentified number of
8   Tiers until the final Tier(n) is reached. Upon entering Tier(n) at the beginning
9   threshold value 8(n) of (x) min., the session has a total cost of $100. Tier(n)
10   has an incremental charge of $0 associated with it, and a usage rate of $0/min.,
11   so the total session cost remains at a constant $100 until the session is
12   terminated at (x + 5) min as shown by the line segment 24.

13   Through this embodiment of the invention it will be appreciated that the
14   total session cost of the session illustrated through FIG. 1 could be determined
15   by reference to the various line segments 14-24 at any point along the axis 4.
16   Thus, the invention provides a pricing model for application to any potential
17   usage amount. Additionally, it will be appreciated that the path of line
18   segments 14-24 can be easily controlled as desired by adjusting the various tier
19   beginning threshold values, incremental charges, and usage rates. The
20   invention thereby provides a pricing model that is most useful for maximizing
21   revenue.

22   Those knowledgeable in the art will appreciate that the invention lends
23   itself well to practice in the form of a computer program product. In particular,
24   an embodiment of the present invention comprises a computer program product
25   comprising a computer usable medium having computer readable program
26   code embodied in the medium that when executed causes a computer to carry
27   out the various steps of the method of the invention. Preferred examples of
28   computer usable mediums comprise magnetic and optical mediums such as
29   disks, and circuitry such as printed or etched circuit cards and chips. Preferred
30   examples of readable computer code comprise programmed instructions such

1   as C++, Java and the like that has been compiled into a machine-readable

2   format.

3   A preferred computer program product is illustrated through the flow

4   chart of FIGS. 2(a)-(c). It will be appreciated that although this invention

5   embodiment is referred to as a computer program product, it could likewise be

6   practiced in the form of a method. With reference to the flow chart of FIGS.

7   2(a)-(c), a brief description of variables will be helpful as summarized in

8   TABLE 2:

Variable:	Description:
TOTUSE	Total Session Usage Amount
USE(1,2,3...n)	Session Usage Amount occurring in each individual Tier(1-n)
THRESH(1,2,3,...n)	Beginning Threshold Value that marks the start of each individual Tier
RATE(1,2,3...n)	Usage Rate for Each Individual Tier
USESUM	Sum Total of Individual Usage Charges for Each Tier
INC(1,2,3...n)	Incremental Charge associated with entry to each individual Tier
INCSUM	Sum Total of Tier Incremental Charges
TOTCOST	Total Session Cost

9   TABLE 2

10   The program product of the invention when executed first causes the

11   computer to determine the total session usage amount TOTUSE (block 52).

12   Individual tier usage variables USE(1,2,3,...n) are also initially set to 0 (block

13   54).

14   The program product then causes the computer to progress through a

15   number of subsets of steps that determine the tier usage values for each of the

16   individual tiers(1) to (n). A first subset is illustrated within the dashed line box

17   56 of FIG. 2(a) and is for determining the tier usage amount USE1 for tier 1.

18   The total usage amount is first compared to the beginning threshold value of

19   tier 2 (block 58), if the total usage is less than the tier 2 threshold, then it is

20   concluded that tier 1 was never exceeded during the session (block 60) and the

1   tier 1 usage USE1 can be set equal to the total session usage amount (block 62)

2   (assuming that tier 1 begins with the preferred beginning threshold of 0 usage).

3   If this result is determined, there are no additional tier usage amounts to

4   determine, and the program product causes the computer to continue on to a

5   subset of steps for determining the total charges for the session (block 64).

6   If it were determined that the total session usage TOTUSE was greater

7   than the Tier 2 beginning threshold value (block 58), then the program product

8   causes the computer to conclude that tier 1 was exceeded during the session

9   (block 66) and to set the amount of usage in tier 1 equal to the total duration of

10   tier 1 (block 68). The program product further causes the computer to proceed

11   to determine the total usage in tier 2.

12   The subset of steps for making this determination is illustrated within

13   dashed line box 70 of FIG. 2(a). Within this subset, an initial determination is

14   made as to whether the session total usage time exceeds the beginning

15   threshold time for the subsequent tier 3 (block 72). If so, tier 2 must have been

16   exceeded during the session (block 74), and tier 2 usage time is set equal to the

17   duration of tier 2 (block 76). It is noted that FIG. 2(a) illustrates the tier

18   duration being determined by the difference between beginning thresholds.

19   This could of course also be determined, by way of example, by using the

20   known tier duration.

21   The program product then causes the computer to proceed on to

22   determine total tier use for tier 3 (block 84). If the session total usage does not

23   exceed the beginning threshold of the next tier, then tier 2 was not exceeded

24   during the session (block 78). If so, the tier usage time for tier 2 is set equal to

25   the total usage time less the beginning threshold value for tier 2 (block 80), and

26   the program product causes the computer to proceed on to a subset of steps for

27   summing the total session cost (block 82).

28   With reference now drawn to FIG. 2(b), several subsets of steps shown

29   in dashed line boxes 86, 88, and 90 that the computer program product of the

30   invention causes the computer to take to determine the usage amount during the

31   session in each of tiers 3, 4, and (n-1); respectively. It will be appreciated that

1   these subsets of steps are essentially the same as those illustrated in dashed line
2   box 70 describing the steps taken to determine the amount of usage that
3   occurred in tier 2. Because these steps are essentially the same for all subsets,
4   they will be described in detail with reference to only one of the subsets of FIG.
5   2(b). Those knowledgeable in the art will appreciate that the description
6   provided will be applicable for not only all subsets illustrated in FIG. 2(b), but
7   for any tier from tier 2 to tier n that may be comprised.

8   With reference to dashed line box 90, then, the computer program
9   product first causes the computer to determine whether the total usage exceeds
10 the beginning threshold of the subsequent tier (box 92). If not, the session did
11 not enter the subsequent tier and must have ended in the current tier (n-1)
12 (block 94). The tier (n-1) usage is accordingly set as the total usage less the
13 beginning threshold of tier (n-1) (block 96), and the program product causes
14 the computer to advance to cost calculation subset f steps (block 102). If the
15 session total usage did exceed the beginning threshold of the subsequent tier,
16 then the current tier must have been exceeded during the session (block 98),
17 and the tier usage for the tier is accordingly set as equal to the duration of the
18 tier, or the difference between the next beginning threshold and the current
19 threshold (block 100).

20   Upon a determination that the total usage exceeds tier (n-1), the program
21 product of the invention will cause the computer to continue determining tier
22 usage amounts in subsequent tiers until a tier is reached that has not been
23 exceeded during the session. This has been illustrated in FIG. 2(b) by a
24 progression to a "continue" block 102.

25   When a tier is reached that the session total usage has not exceeded, the
26 program product will direct the computer to a subset of steps for calculating the
27 total session cost. This subset is illustrated in FIGS. 2(c). The total session
28 cost comprises two components: a total usage cost, and a total incremental cost.
29 Referring now to FIG. 2(c), the program product begins total cost calculation
30 by causing the computer to set the incremental charge total to zero (block 150),
31 and to calculate the total usage cost for the session, which generally comprises

1   summing the usage charges for each tier (block 152). The usage charges for
2   each of the tiers are calculated by multiplying the tier usage amount
3   (TIER(1,2,3…n)) previously determined by the tier usage rate
4   (RATE(1,2,3…n)). The computer program product of the invention may cause
5   the computer to retrieve stored tier usage rates (RATE(1,2,3..n)) for each tier
6   from a depository where they have been stored after input by a user.

7   The incremental charge portion of the total session cost is calculated
8   through steps illustrated within the dashed line box 154 of FIG. 2(c).
9   Generally, these steps comprise summing the incremental charge for each tier
10 entered during the session to a total sum incremental charge amount. As those
11 knowledgeable in the art will appreciate, there are a number of ways to
12 accomplish this. One preferred manner is through the steps illustrated within
13 box 154 that generally comprises stepping through a loop. Each successive run
14 through the loop examines a successive tier, starting at tier 1 (block 158). A
15 decision is made at each step of the loop to determine whether the
16 corresponding tier was entered during the session (block 156). If so, the
17 incremental charge associated with that tier is added to the incremental charge
18 sum for the session (block 160). If a respective tier was not entered during the
19 session, it is determined that no subsequent tiers were entered and that there are
20 no additional incremental charges to add to the incremental total (block 162).

21   When this occurs, the loop of box 154 is exited, and the program
22 product causes the computer to calculate a total session cost by adding the total
23 usage cost to the total incremental cost (block 164). It will be appreciated that
24 although no additional steps are illustrated in FIG. 2(c), other embodiments of
25 the computer program product of the invention may comprise causing the
26 computer to execute additional steps regarding subsequent treatment of the
27 total cost, such as displaying the cost, or otherwise transmitting, reporting, or
28 storing the total cost.

29   Those knowledgeable in the art will likewise appreciate that the method
30 and program product of the invention may be carried out in a wide variety of
31 embodiments other than that illustrated and discussed herein that will fall

1   within the spirit of the invention and the claims. By way of example, the

2   sequence of many of the invention steps may be arbitrary, and may easily be

3   altered without significant effect on the outcome of the invention. The tasks of

4   determining tier usage amounts and tier usage costs could be accomplished in a

5   single subset of steps, by way of example. Likewise, the format of many of the

6   steps as illustrated is intended to be by way of example only. Many of the

7   method and program steps could be accomplished in formats other than those

8   illustrated within the scope of the invention as claimed.

9   It will be appreciated that the present invention thereby provides a

10 solution to many otherwise unresolved problems in an efficient and novel

11 manner. For example, a method for pricing a usage based service, such as

12 network computer service, telephone service, or the like, is provided that may

13 be easily applied to price any amount of usage, and to flexibly price usage so as

14 to maximize revenue.   The invention advantageously allows for combining

15 elements of fixed price and usage based price models in a flexible and easily

16 applied format.

17   The advantages of the disclosed invention are thus attained in an

18 economical, practical, and facile manner. While preferred embodiments and

19 example configurations have been shown and described, it is to be understood

20 that various further modifications and additional configurations will be

21 apparent to those skilled in the art. It is intended that the specific embodiments

22 and configurations herein disclosed are illustrative of the preferred and best

23 modes for practicing the invention, and should not be interpreted as limitations

24 on the scope of the invention as defined by the appended claims.